



Systematic Literature Review: Teachers' Technological and EMI Readiness across Different Levels of Education

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Abstract. This systematic literature review explores the technological and English as a Medium of Instruction (EMI) readiness of elementary school teachers participating in English immersion programs. As the demand for bilingual education grows, ensuring teachers are equipped to effectively integrate technology and EMI in the classroom is critical for fostering student success. The review synthesizes research from various studies to assess teachers' preparedness in using digital tools and delivering instruction in English, particularly in non-native English-speaking regions. Key findings highlight the challenges teachers face, including limited access to technology, insufficient training, and language proficiency issues. The study also identifies best practices and frameworks that can enhance teachers' readiness for effective EMI and technological integration in immersive learning environments. The review concludes with recommendations for policy development and teacher training programs to bridge gaps and improve the overall effectiveness of English immersion education.

Keywords: Technological readiness, EMI readiness, ELT, SLR.

1. Introduction

In recent years, the growing importance of English as a global language has fueled the expansion of English immersion programs worldwide, particularly in non-native English-speaking regions. These programs aim to cultivate bilingualism by immersing students in environments where English is the primary medium of instruction. However, the success of such programs hinges not only on students' ability to adapt but also on the readiness of teachers to deliver high-quality instruction in English. Moreover, the rapid technological advancements in education further underscore the need for teachers to integrate digital tools effectively into their classrooms. The convergence of these two critical factors—technological proficiency and English as a Medium of Instruction (EMI) readiness—presents unique challenges for elementary school teachers in immersion programs, especially in regions where English is not the first language.

The concept of EMI is gaining traction globally, with educational institutions increasingly using English to teach subjects such as science, math, and history, even in

non-English-speaking countries. However, research indicates a significant gap in teachers' preparedness to adopt EMI, particularly at the elementary level. Studies by Dearden (2014) and Macaro et al. (2018) highlight that many teachers lack the requisite language proficiency and pedagogical skills to use EMI effectively. This challenge is exacerbated in regions where English proficiency levels are lower, and teachers may not have sufficient exposure to or training in EMI methodologies. As Macaro (2018) observes, "teachers' linguistic limitations often result in a superficial application of EMI, where students are exposed to fragmented English instead of a comprehensive language immersion experience."

In addition to EMI readiness, technological integration in classrooms has become a critical aspect of modern education. The use of digital tools can enhance teaching methods, foster engagement, and provide access to a wider range of learning materials. However, despite the potential benefits, research consistently reveals a gap in teachers' technological proficiency. A study by Lawless and Pellegrino (2007) found that while many teachers recognize the importance of technology in education, they often lack the skills or confidence to incorporate it effectively into their instruction. The lack of access to adequate technological infrastructure, particularly in low-resource schools, further complicates the issue. Moreover, a more recent study by Tondeur et al. (2017) stresses that even when teachers have access to technology, insufficient training and professional development opportunities hinder their ability to fully utilize these tools in teaching.

The intersection of these two challenges—technological readiness and EMI proficiency—creates a critical gap in current educational practices. While there is substantial literature on the importance of EMI and technology in education, few studies provide a comprehensive analysis of how these two elements converge in the context of elementary school teachers in English immersion programs. Most research tends to focus on either EMI or technological integration in isolation, leaving a gap in understanding how teachers can be prepared to tackle both challenges simultaneously.

Furthermore, the literature also suggests that current teacher training programs are inadequate in addressing these dual demands. According to Tsui and Tavares (2020), traditional professional development models often fail to equip teachers with the necessary competencies to integrate technology while delivering instruction in English. They argue for a more holistic approach that considers both the linguistic and technological aspects of teaching in immersion environments. This gap in teacher preparation underscores the need for a systematic exploration of both EMI and technological readiness in elementary school teachers.

This systematic literature review aims to bridge this gap by synthesizing research on the technological and EMI readiness of elementary school teachers in English immersion programs. It seeks to assess the challenges teachers face in integrating technology and delivering instruction in English and to identify best practices that can enhance teacher preparedness. Specifically, this review will analyze key studies that address teachers' access to digital tools, the quality of training they receive, and their proficiency in using EMI. The findings from this review will provide valuable insights for policymakers, educational institutions, and teacher training programs to develop

more effective strategies for equipping teachers with the skills they need to thrive in immersion classrooms.

In conclusion, this review will not only highlight the current gaps in research but also offer practical recommendations for improving teachers' technological and EMI readiness. By addressing these gaps, the review aims to contribute to the development of more robust bilingual education programs that can better support both teachers and students in navigating the complexities of English immersion education in an increasingly digital world.

2. Method

This systematic literature review followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure a structured and transparent approach. The review focuses on assessing the technological and English as a Medium of Instruction (EMI) readiness of elementary school teachers involved in English immersion programs, particularly in non-native English-speaking regions.

2.1. Review Protocol

To address the research question, "How prepared are English teachers in terms of technological integration and EMI implementation in classroom context?", a comprehensive literature search was conducted using specific keywords. The search aimed to identify studies that explore teachers' preparedness for integrating technology and delivering instruction in English, with attention to challenges such as limited access to technology, insufficient training, and language proficiency issues.

- Key online databases—**ScienceDirect**, **ERIC**, and **JSTOR**—were searched using a combination of predefined keywords related to the study topic. The search string was developed using Boolean logic: ("technology readiness" OR "digital tools" OR "technological integration") AND ("EMI" OR "English as a Medium of Instruction" OR "English immersion") AND ("teacher preparedness" OR "teacher readiness" OR "teacher training").

The search targeted studies published between **2014 and 2024** in English, with a focus on English teachers and non-native English-speaking regions.

2.2. Inclusion and Exclusion Criteria

To refine the search results, the following inclusion and exclusion criteria were applied:

- **Inclusion criteria:**
 - Peer-reviewed articles published between 2014 and 2024
 - Research that examines technological and EMI readiness, including training, access to digital tools, and instructional challenges.

- **Exclusion criteria:**
 - Articles not related to EMI.
 - Non-English publications and duplicate articles across databases.

After applying these criteria, the initial search yielded a total of 87 articles. Through the application of inclusion and exclusion filters, this number was narrowed down to 30 relevant articles.

2.3. Screening and Assessment

To ensure the relevance and quality of the selected articles, a two-step screening process was applied. First, titles and abstracts were reviewed for relevance to the research question. Then, full-text articles were assessed for methodological rigor and the depth of discussion on teacher readiness for technology and EMI integration.

During the final screening process, 13 articles were selected for detailed analysis based on their contribution to the understanding of teachers' preparedness for technological integration and EMI across different level of education. These studies were further analyzed for thematic focus, such as access to digital tools, teacher training, and the impact of language proficiency on instructional effectiveness.

2.4. Data Extraction and Analysis

The selected studies were systematically analyzed to extract key information, including study design, sample size, geographical focus, challenges faced by teachers, and best practices for improving technological and EMI readiness. The findings were synthesized to identify common trends and challenges, as well as frameworks or models that support teachers in overcoming these barriers.

3. Findings and Discussion

This systematic literature review identified several critical themes regarding the technological and English as a Medium of Instruction (EMI) readiness of school teachers in classroom settings, particularly in non-native English-speaking regions. These findings are contextualized through current research, including new insights from recent studies, providing a comprehensive analysis of the challenges and best practices for enhancing teacher readiness.

3.1. Technological Readiness: Limited Access to Technology

A recurring issue across the literature is the limited access to technological resources in schools, especially in non-native English-speaking regions. Research highlights the digital divide, particularly in rural and underfunded areas, where teachers struggle to access essential tools such as computers and reliable internet. According to Koehler & Mishra (2019) and Hidayati et al. (2023), the absence of these resources significantly constrains efforts to implement technology-based learning. Furthermore, recent studies

confirm that despite the global shift toward digital learning, this divide persists, with teachers in underserved areas often lacking the infrastructure needed to implement EMI effectively (Frontiers, 2023).

The lack of technological infrastructure severely limits the potential for creating interactive, technology-enhanced EMI classrooms (Ogwu, 2016). Even when teachers are motivated to integrate digital tools, insufficient resources result in suboptimal teaching practices, as noted by Shin et al. (2020), who found that teacher burnout often stems from this frustration. Ogwu's (2016) findings reveal that teachers' mode of preparation on technology influenced their competency in ELT. This issue contributes to teachers' poor technological readiness for the use of digital technology in teaching (Milawati and Sholeh, 2020). Solutions such as increased investment in mobile devices and affordable wireless internet solutions can help bridge the gap and support more interactive EMI environments.

3.2. Teacher Training and Professional Development: Insufficient Training

The review highlights the inadequacy of teacher training programs in equipping educators with the necessary skills for both technological integration and EMI delivery. According to Tondeur et al. (2017), many teachers report a lack of confidence in their ability to effectively use digital tools in EMI settings. Further corroborate this, suggesting that continuous and specialized professional development is essential for teachers to stay abreast of emerging technologies in education. However, Padmadevi et al. (2023) discovered that teachers positively evaluate multimodal training, which improves teacher readiness for integrating technology-based in classroom setting.

Teachers require professional development that integrates both technological proficiency and EMI-specific pedagogical strategies. Ismail (2024) states that a lack of prior EMI teaching experience and preparation made teachers' EMI experiences challenging. Graham et al. (2018) advocate for training programs that combine theoretical knowledge with practical, hands-on experience. More recently, the Frontiers (2023) study emphasizes the need for training in innovative methods such as mixed reality and gamified learning, which have been shown to improve teacher engagement and student outcomes.

3.3. Language Proficiency Challenges: Language Barriers for Non-native English-speaking Teachers

Language proficiency challenges remain a significant issue for many non-native English-speaking teachers. Studies report that teachers often struggle with their own English proficiency, which undermines their confidence and effectiveness in EMI instruction. Dearden (2016) found that non-native teachers frequently experience difficulties teaching content in English, particularly when their own language skills are not fully developed. Kurniati (2023) identifies many challenges to the use of EMI, including a lack of comprehension of technical words in the subject course and teachers' limited English competence. Furthermore, the findings of Hammou and Kesbi's (2023) study demonstrate good attitudes regarding the adoption of EMI in Moroccan

education, although teachers appear dissatisfied with how it has been implemented. They believed science teachers were unprepared for such a new trend. The survey also found that teachers' inadequate English proficiency was deemed the greatest impediment to the successful implementation of EMI in Moroccan secondary schools, and the fundamental rationale for utilizing the first language in the EMI classroom. Additionally, Ba et al. (2023) identify the most challenging elements in the implementation of EMI as a lack of teacher language assistance, a lack of an English environment in the school, and insufficient bilingual teaching materials.

The correlation between teachers' language proficiency and the success of EMI programs is well-documented. Lasagabaster (2018) noted that teachers who lack fluency in English face challenges in delivering clear instructions and maintaining student engagement. Addressing this issue requires ongoing language support for teachers, such as immersive language training programs, to ensure they can meet the demands of EMI. In a different vein, Ismail (2024) stated that four teachers found their EMI teaching experience useful, as it increased their English language competence, made access to teaching materials simpler, and encouraged them to study more English content. Furthermore, collaborating with English language instructors allowed them to improve bilingual teaching skills. However, two EMI teachers viewed EMI as a hardship. They expressed difficulty with the additional lesson planning necessary.

3.4. Best Practices for Technological and EMI Readiness: Identified Frameworks and Models

Several studies, including those from Rahimi & Pourshahbaz (2018), highlight best practices such as blended learning models, which combine traditional instruction with online resources

The 2023 study by PLOS ONE suggests that these frameworks are particularly effective in resource-limited settings, where digital tools can be used to supplement face-to-face instruction.

The adoption of blended learning and flipped classroom models provides flexible solutions for overcoming technological barriers. Hockly (2018) argues that these approaches not only improve teachers' technological readiness but also enhance student engagement. The use of digital tools outside of class allows for more interactive and focused learning during classroom time, which is especially beneficial in EMI environments. Not only the teaching strategy, but Lo and Othman (2023) also emphasize the importance of instructors' knowledge, understanding, skills, abilities, and attitudes in further improving intercultural communication competence in handling the increasingly diverse student population in EMI classrooms.

3.5. Recommendations for Policy and Teacher Training Programs

The review points to several policy recommendations to bridge gaps in technological and EMI readiness, with an emphasis on the importance of infrastructure development and comprehensive teacher training programs. Warschauer & Matuchniak (2019) advocate for increasing government investment in digital infrastructure, especially in

rural and underserved areas. Furthermore, Shuib et al. (2018) emphasize the significance for English language learning providers to consider students' ideas and predispositions while implementing a technological learning approach in their teaching. A better knowledge of students' readiness for mobile learning may help to improve English language teaching and learning using technology. Proactive school management encourages teachers to integrate and successfully use new technologies, with the majority of instructors falling into the high-technology readiness group (Kadiyono and Wardhani, 2024). The crucial role of school leadership in creating a favorable technology environment, with implications for future teacher training programs. There is a pretty good acceptance of using technology in schools if it has been implemented and is supported by access factors such as computers, training, and other technical support, and teachers must truly be able to use learning technology because these are all interconnected and because teachers are crucial for successfully using technology in schools' teaching and learning process systems (Hidayati et al., 2023).

New studies, such as those from Frontiers (2023), highlight the importance of providing teachers with both technological and language proficiency training to ensure the effective delivery of EMI. Effective policy changes should focus on improving access to technology and providing ongoing professional development. Selwyn (2020) emphasizes that teachers must be supported not just with resources but with the skills necessary to use these tools in a pedagogically sound way. By investing in infrastructure, professional development, and language training, policymakers can help improve the effectiveness of EMI programs.

4. Conclusion

To enhance the readiness of elementary school teachers for technological integration and English as a Medium of Instruction (EMI) in bilingual education, several recommendations are imperative. Firstly, it is crucial for educational stakeholders to invest in digital infrastructure, ensuring that all teachers have access to essential resources such as computers and reliable internet, particularly in underserved areas. Secondly, comprehensive professional development programs should be developed, focusing on both technological skills and EMI pedagogical strategies. Ongoing training should include workshops that incorporate modern educational technologies, empowering teachers to effectively engage students in EMI contexts. Additionally, language support programs tailored for non-native English-speaking teachers are essential to build their confidence and competence in delivering instruction in English, enhancing overall teaching effectiveness. Furthermore, fostering collaborative learning environments, such as peer mentoring and professional learning communities, can facilitate the sharing of experiences and best practices among teachers. Lastly, promoting innovative teaching frameworks, including blended learning models that combine traditional and digital approaches, will allow educators to create dynamic and engaging learning experiences for their students. By implementing these strategies,

educational institutions can significantly improve the effectiveness of EMI programs and enhance educational outcomes for students in English immersion settings.

Acknowledgments. This research was generously funded by the Faculty of Cultural Studies, Universitas Brawijaya. We gratefully acknowledge their financial support, which has been instrumental in successfully completing this project.

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